

REMARKS

Claim Objections:

Claim 21 has been amended to replace the punctuation therein and also to delete unnecessary language. These amendments do not change the scope of the claim or the claims which depend thereon.

In response to the objection to claim 24 in reciting that stream (7c) is withdrawn between stream (7b) and stream (5), Applicants submit these embodiments are supported by Fig. 2. Absorption, column 6 is operated as a simulated moving bed, which is a loop where downward movement to the bottom of the column returns to the top. Therefore, it is correct to say in claim 24 that "a second raffinate product (7c) is withdrawn between the withdrawal point of first raffinate product (7b) and the injection point of desorbent (5)."

Rejection Under 35 U.S.C. §112:

The term "essentially" has been replaced with the word "substantially", so this rejection is now moot. Support for this language is found at page 13, lines 22-25 and page 14, lines 1 and 2.

Applicants maintain that the term "essentially" is clear in meaning in the context employed in claim 25 and its use in this context has been found to be acceptable in related applications (see U.S. Patent 6,841,714, claim 10). Applicants have amended claim 25 to conform with the specification in defining the levels of absorbent and ethylbenzene. This amendment does not change the scope of claim 25 and it is not necessary to render claim 25 patentable. The present language satisfies the requirements of 35 U.S.C. §112, second paragraph, and is not indefinite.

Rejections Under 35 U.S.C. §103:

The Examiner alleges that independent claim 21 is obvious in view of the combined teachings of Magne-Drisch (U.S. Patent No. 6,369,287) in combination with Lee (U.S. Patent

3,306,942). Magne-Drisch discloses a process for co-producing ethylbenzene and paraxylene and is said to disclose that an ethylbenzene production line can be integrated into a plant for producing styrene. The Examiner acknowledges that Magne-Drisch does not disclose a dehydrogenation step to produce styrene from ethylbenzene but alleges that it would have been obvious for one skilled in the art at the time the invention was made to modify the process of Magne-Drisch to include a dehydrogenation step. More particularly, the Examiner alleges that it would be obvious to take stream (9) consisting of 99% pure ethylbenzene (see col. 8, line 26) and convert it to styrene.

The Examiner cites no teaching or suggestion within either reference or any other evidence which would lead one skilled in the art to make these modifications. Furthermore, even if these modifications were made to the methods of Magne-Drisch, it would not result in the method claimed in claim 21.

In claim 21, a raffinate product containing metaxylene, orthoxylene and ethylbenzene is dehydrogenated to provide an effluent stream containing styrene, metaxylene, orthoxylene, unconverted ethylbenzene and byproducts. The effluent stream referred to by the Examiner at column 8, line 26 of Magne-Drisch is 99% pure ethylbenzene and does not contain the components of the dehydrogenation step recited in claim 21. Therefore, not only do the combined references fail to show or suggest a dehydrogenation step for ethylbenzene, they fail to show or suggest where in the production process the dehydrogenation step should take place. Contrary to the Examiner's suggestion that a pure stream of ethylbenzene be subjected to dehydrogenation, the dehydrogenation step of claim 21 is performed on a distilled raffinate product containing not only ethylbenzene but metaxylene and orthoxylene where the content of ethylbenzene is "minor" compared to the xylenes. There is no hint or suggestion within the cited references to perform a dehydrogenation step at such a stage in the production of ethylbenzene with such a feed stock. Therefore, claim 21 and all claims dependent thereon (claims 22-42) are unobvious. Applicants submit there are other features which distinguish the methods claimed herein from the disclosures within Magne-Dirsch and Lee, but this analysis is unnecessary.

§Appl. No. 10/666,523
Amdt. dated April 19, 2007
Reply to Office Action of, January 19, 2007

Obviousness-type Double Patenting:

There is clearly no basis for the provisional rejection of claims 21-37 and 39-42 under the doctrine of obviousness-type double patenting based on claims 1-20 of U.S. Patent 6,841,714. It is admitted in the Office Action that the claims of U.S. Patent 6,841,714 do not include a dehydrogenation step. No evidence has been presented to show or suggest it would be obvious for one skilled in the art to modify the subject matter of the '714 claims and include a dehydrogenation step to produce styrene. It is noted that the methods of the '714 patent are directed to the co-production of paraxylene and metaxylene at high levels of purity and not ethylbenzene. While ethylbenzene is present in an intermediate fraction (11); based on the disclosure, this intermediate fraction is not pure and has a low concentration of ethylbenzene. The disclosure indicates that raffinate R2 (12) includes ethylbenzene but in amounts which can be less than 1% by weight. In view of the low concentrations of ethylbenzene, Applicants maintain that one skilled in the art would not be motivated to incorporate a dehydrogenation step into the methods of U.S. Patent 6,841,714 and would not have any motivation to incorporate such a step at the location in the step sequence recited in claim 21. Therefore, the obviousness-type double patenting rejection should be withdrawn.

Based on the above remarks, Applicants submit that all pending claims are in a form suitable for allowance and patentable over the cited references. Therefore, withdrawal of the rejections and allowance of these claims are earnestly solicited.

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The Commissioner is hereby authorized to charge any fees associated with this response or credit any overpayment to Deposit Account No. 13-3402.

Respectfully submitted,

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Attorney Docket No.: PET-2102

Date: April 19, 2007